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ABSTRACT

An alternative view of learning and an alternative view of research on learning are described in this paper. Learning is seen as a change in the conception of some aspect of reality and it is argued that learning has to be described in terms of its content. This line of research is intended to represent the learner's perspective and the description made from this point of view will thus differ radically from descriptions arrived at from the expert psychologist's perspective. Rather than characterizing underlying "processes" or "mechanisms," it is important to characterize the qualitatively different ways in which individuals understand concepts, principles, and aspects of reality dealt with in their studies. Even the act of learning appears in qualitatively different ways in the learner's consciousness. For some, learning involves memorizing a given text, but for others, learning implies finding out something about reality by reading that text. The qualitative differences in the experience of learning are closely correlated with qualitative differences in the outcome of learning. In order to improve learning, it is necessary to find out the different ways in which students think about the content and to raise their consciousness of the way they set about the learning task. (30 references) (Author/GL)

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ZIFF PAPIERE 30

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Learning as Seen from the Learner's Point of View

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An alternative view on learning and an alternative view on research on learning is put forward in this paper. Learning is seen as a change in the conception of some aspect of reality and it is argued that learning has to be described in terms of its content. This line of research is supposed to represent the learner's perspective and the description made from this point of view will thus differ radically from descriptions arrived at from the expert psychologist's perspective. Instead of characterizing underlying "processes" or "mechanisms" we intend to characterize the qualitatively different ways in which individuals understand concepts, principles, aspects of reality dealt with in their studies. Even the act of learning as such appears in qualitatively different ways in the learner's consciousness. For some, learning is to memorize a given text, but for others, learning implies finding out something about reality by reading that text. The qualitative differences in the experience of learning are closely correlated with qualitative differences in the outcome of learning. In order to improve learning, we have to find out the different ways in which the students think about the content, on one hand, and to raise their consciousness of the way they set about the learning task, on the other.

By and large there are two distinctively different approaches to research into learning. One is the from-the-outside perspective; we focus on the learner and we want to describe what he does or what is going on in his head. The second approach is represented by the from-the-inside (or experiential) perspective; we focus on the learner's world and we want to describe how that which he is taking part in appears to him. In the first case we ask questions of the kind: What in actual fact, is learning, Which are the mechanisms of learning? Why do some people succeed better than others in learning? Such questions are as a rule general questions. If we - on the other hand - take the learners perspective it is obvious that learning is always the learning of something. It is reasonable to assume that the learner when engaged in learning - at least to a certain extent - must be conscious of what he is learning, i.e. he must be conscious of the content of learning. What is visible from the learner's perspective varies as does that which he is learning about.

In addition to being aware of what he is learning - in one way or another - the learner is aware that he is learning. The way the process of learning is experienced by the learner is the more general aspect of learning from the experiential perspective. According to this line of reasoning improvements in learning have to be based on changes in the learner's consciousness of the content and process of learning.

I DESCRIBING CONCEPTIONS OF THE CONTENT OF LEARNING

As far as our own research is concerned, we have introduced a model of description in the study of learning which is similar to the one adopted frequently in developmental psychology (especially of Piagetian kind). Considering learning from written or spoken communication as an act of interpretation, we described the qualitatively different ways students apprehend the concept of "output of education", "productive resources", "selective measures" or "the law of diminishing returns" or the Malthus theory of population, just to mention some examples.

In a study reported by Marton & Wenestam (1979), for instance, one of the texts used was an excerpt from Hempel (1966) the main point of which is that hypotheses concerning causal factors are tested by comparing two otherwise identical conditions, one in which the presumptive causal factor is present and one in which it is absent. If the expected effect occurs, then the

hypothesis is confirmed, otherwise not. This is illustrated by the Austro-Hungarian physician Ignaz Semmelweis' search for the cause of childbed fever in 1844-48. He tested one hypothesis after the other comparing the frequency of childbed fever between two hospital wards which were always identical except for one factor.

Four qualitative different ways of understanding this text were identified on the basis of an analysis of subjects' written summaries. For the sake of simplicity we want to illustrate only two of the types of answers:

"The text begins with how one sets about testing a hypothesis. One investigates two different groups, one of which will give a positive result and the other a negative result in relation to the hypothesis. If the hypothesis is faulty, then this difference won't be obtained one will have to start again with a new hypothesis. This was illustrated by an example about Semmelweis. S. wondered why the mortality rate from childbed fever was so different (about 9% and about 2%) in wards 1 and 2 at the hospital in Vienna (1840's)..."
(S 45)

"The text is about a professor who is going to find out the reason for childbed fever being so much higher in the first ward than in the others. It was about 9% while the others had only 2-3%. He tested a lot of different reasons, one of which was that he thought that it could be a priest who caused it all when he went through the ward with ..."
(S 54)

The first of these answers represents an understanding of the main idea in the text and of the way it is exemplified by the case of Semmelweis' discovery. The subject who gave the second answer, on the other hand, seems to have thought that the text was about Semmelweis' discovery. The example is not an example in this case but becomes the main point in itself.

The understanding and perception of specific concepts and principles have been studied i.a. in Economics at university level by Lars Owe Dahlgren (see e.g. Dahlgren & Marton 1978) and in physics at upper secondary level by Leif Lybeck (Lybeck 1978 b). The latter has also made a distinction between on the one hand the understanding of specific concepts and principles in Physics such as proportionality, density, speed and on the other the understanding of general aspects of scientific activities (such as problems, hypotheses, instruments and, of course, physics itself as a science).

In their investigation of proportional reasoning in adolescents Johansson and Lybeck (1978) revealed two major forms of thought with several sub-categories within each. Let us take a simple example. The problem is the following: a car moves at a constant speed and in 3 seconds it travels 6 meters. What distance does it travel in 9 seconds? Both correct and incorrect solutions can be arrived at in either of two possible ways. On the one hand the student may focus on the relationship within the variables: "9 is 3 times 3, thus I have to multiply 6 by 3, which makes 18". On the other hand he may concentrate on the relationship between the variables: "6 is twice 3, thus I have to multiply 9 by 2 which makes 18".

From the point of view of mathematical calculus it is of course quite irrelevant which of the two approaches is used. In physics however, it does make a difference: relating two different quantities to each other in terms of a quantified relationship is central to the use of the concept of function in physics. The second approach described above is thus far more fruitful if the student is to progress in his studies.

Historically the first form seems to have preceded the second. When using a two-armed lever as a balance to measure weight by means of length, Archimedes (according to Lybeck) either computed the ratio between the heavier and the lighter weight or between the larger and the shorter arm of the balance, but did not compare length and weight directly by taking the ratio between either the longer arm and the heavier weight or between the shorter and the lighter weight (Lybeck 1978 a, p 33).

In addition to introducing an alternative way of describing the outcome of learning we wanted to make the point that it is worthwhile to find out in which different ways basic concepts and principles can be understood by people. There is a field of inquiry, basically unlimited, which includes attempts to finding categories in terms of which effects of learning experiences within or outside of educational contexts can be described.

Obviously when talking about effects we do not mean "to what extent" (i.e. effects in terms of variables defined in advance), but rather we think of "what" i.e. the research task is exactly finding suitable categories to describe whatever changes in the conception of various aspects of reality, various ideas and phenomena that may have occurred.

Perry (1970) has, for instance, found that on a very general level the impact of college on the students' thinking could be described in terms of a transition from absolutistic ("there is one right answer to each question") to relativistic ("there are many right answers to each question") thinking and from that to commitment ("I have to take the responsibility of choosing"). These categories or levels were not defined in advance and the aim of Perry's investigation was not to ascertain to what extent changes occurred. His main result was exactly what kind of change that occurred.

Our way of reasoning is, however, not in accordance with the mainstream research tradition in Educational Psychology. The notion that "... learning should be described in terms of its content" has been both misunderstood and argued against. I should like in this context to deal briefly with a certain misunderstanding, with a certain point of criticism and with a certain area of disagreement.

A misunderstanding

Describing the outcome of learning in terms of the different ways the content is understood has been interpreted by some of our colleagues as if we had invented a new way of describing the outcome of learning in terms of a new variable which measured the depth of understanding. It is then thought that this "new variable" has a number of values varying from shallow to deep understanding and that it can be used in various contexts in order to study differences between groups of people or between different treatments. The focus is on the sources of variation and outcome is only of interest as a measure of them. It is, of course, perfectly true that there is a similarity between sets of interpretations of for instance texts read, in the sense that in relation to the author's intentional meaning one can discern interpretations which come more or less close to that meaning. This is however not our point. We argue for the value of revealing in which different ways various specific ideas are understood. The notion that the outcome should be described in terms of the content of learning implies that the description of the outcome will differ from case to case as long as the content differs. (The students' understanding of the logic of the testing of hypotheses in scientific research in our example above and different forms of proportional reasoning in the other example are necessarily described in different terms.) If this is not realized it is sometimes obviously hard to understand what the point is of starting investigations of students' understanding of Economics when we have already

run a project on the understanding of some part of physics. Some critics quite reasonably think - in accordance with their conceptions of the law of diminishing returns - that there cannot be so much new knowledge to gain. They do not realize that if we want to find out, for instance, different ways of understanding the law of diminishing returns and the concepts underlying it we have to investigate this very question even if we have already mapped, for instance, other different forms of thought that may be brought to the fore when the task places demands on proportional reasoning.

An objection

An objection to the approach advocated by us does start with the realization of the fact that the research undertakings which varies as to content are in fact different. Can we - is then argued - really afford to invest in research which at the best will give us results which are related to some basic concepts and principles of mechanics? Is it not an extremely narrow task? We obviously do not think it is. As a rule people do not think that, let us say, the second law of thermodynamics or the Malthus theory of population is too specific. Is, by the way, the description of the different ways of understanding and the various conceptions underlying a physical law necessarily simpler than the law itself? Is describing various ways of thinking about and various necessary prerequisites of thinking correctly about a mathematical function, for instance, a more narrow task than investigating the relationship between critical thinking and academic achievement (whereas the generalizability of the results is delimited by the specific meaning given to the variables, the specific group of people participating and the specific place and time for the investigation)?

Howard Gruber, an American psychologist who has taken the detailed study of the individual development of great scientific achievements, as the Darwin theory of evolution and the Piaget theory of genetic epistemology, as the point of departure for the study of cognition, says:

"In typological and taxonomic efforts by psychologists what is most striking is the vector toward simplicity. Whole literatures are founded on simple dichotomies, on six-type taxonomies, or on lists of no more than a few dozen traits. Meanwhile our colleagues in biology think in terms of 3 million known species, not to speak of all those that have perished."

(Gruber 1977, p 240)

It is most interesting to speculate about why generalizability in another dimension (and not across content) is so hard to accept. Why is a topic like "understanding basic concepts and principles of mechanics at university level" frequently seen as a very narrow and specific research task. Is it because "basic concepts and principles of mechanics" is thought of in terms of the pages in the textbooks where they are explained or in terms of the teaching hours assigned for their presentation? Is it because "basic concepts and principles of mechanics" are not seen by the critiques themselves as ideas about and interpretations of physical aspects of the reality we are all living in, interpretations which moreover to a great extent underly our technological society.

A disagreement

There is another area of disagreement which concerns the fact that research which is said to be subject-matter related is not necessarily content-related in our sense of the word. As far as school learning is concerned we are obviously arguing for research clearly more closely related to the subject-matter. This can be taken as an argument for research which is simply carried out in the context of one or another school subject.

The relatedness of a research undertaking to a certain school subject is, however, most frequently a very insufficient guarantee for content-relatedness. Investigation of the relationship between critical thinking and academic achievement or of the relative merits of a certain kind of advance organizer in physics teaching have, for instance, very little to do with subject-matter. There is a content, of course, but it has an instrumental role. Various conceptions of the subject-matter (which we find interesting) are simply not visible from this perspective. Problems are formulated in terms of general (and in our opinion rather loose) terms such as "critical thinking", "academic achievement in Economics", "advance organizer", "examination results in physics".

In actual fact, there is a certain tendency in Educational Psychology to start with less artificial tasks than was the case previously, to being more task specific in the description of learning and event to introduce questions phrased in terms of the from-the-inside perspective (e.g. how do experts v. novices perceive problems in physics, which are the multiple realities of the classroom?). The problem is that even relatively novel problem

formulations are handled within the frames of a scientific tradition where they - in our opinion - do not belong. Descriptions of the way people learn specific problems such as learning the basic principles of probability calculus, or the way they perceive and solve a certain problem in statistics are often seen as something which is to be explained in terms of more basic operations or as something to be used in order to test hypotheses derived from some more general model.

From the point of view argued for in this paper, there are two main problems involved in the explaining, hypothesis-testing, predicting approach. First, the description of experience (of for instance a problem in physics) is not seen as a result in itself, rather it is seen instrumentally as something to be explained, something to test our hypothesis with. In accordance with this line of reasoning, the "real" results are the explanation or the verification/falsification of the hypothesis. The focus is thus shifted again from the autonomous level of experience.

II DESCRIBING CONCEPTIONS OF LEARNING ITSELF

In the previous section we have dealt with studies of how the content of learning appears in the learner's perspective. (In fact, we have mainly discussed some criticism and misunderstandings of our arguments for this kind of research.) There is, however, another level involved in learning. We pointed out above, that the learner is not only conscious of what he is learning but also that he is learning. Taking the learner's point of view we can not only study his experience of the content of learning but also his experience of learning itself.

Among the first results published by our research group were descriptions of two different ways of experiencing learning. We found that some of the subjects seem to regard the text they have been given to read as the object of the learning process and memorizing the text as the aim of learning. On the other hand, there are those who focus their attention on something beyond the text, so to speak, and regard it solely as a means for finding out something about the phenomena treated. We called these two different ways of approaching the learning task the surface and deep approaches (Marton 1974, Marton & Säljö 1976 a). Thus, this description concerns the individual's way of conceiving, or misconceiving, the relationship between the subject of the text and the text itself. Svensson (1977), who used the same material at the same time, chose to make a distinction in terms with regard to whether

the individual sees the text as the sum of its parts, i.e. atomistically, or as a whole consisting of a number of parts with mutual relations between the whole and its parts that create understanding, i.e. holistically.

At about the same time as our first studies were published, Noel Entwistle in Lancaster, England, started a research project, the aims of which were similar to our own. Our results were derived from interviews with undergraduates from the faculty of social sciences. In Lancaster, the aim was to compare the effects of the institutional environment on the learning process. The class of learning tasks that was to be studied was enlarged:

"Analysis of the interviews in the present study shows that the concept of deep and surface levels of processing is applicable also to tasks such as essay writing and problem-solving in science. There seem to be three ways in which a deep level approach is manifested (a modification of Marton's own categories): a tendency on the part of the student to relate the task to personal experience; a desire to make active attempts to relate the different parts of a task to each other or to other tasks; an intention to impose a structure on the whole task and think about its meaning. In a surface level approach to a task, the student indicates an intention to treat the learning material as an isolated, elemented phenomenon; approaches the task unreflectively or passively; and may try to memorise the material."
(Ramsden 1979)

Brew and McCormick (1979) from the Open University, described differences in the approach to studies in computer technology from a somewhat different aspect:

"Two contrasting ways of viewing the material presented to students can be identified. One way was to view the material presented in lectures as a framework or skeleton of main ideas on which it was necessary for students to build in their own thinking, further reading and experimental work. In terms of the subject as a whole, the lecture represented the tip of the iceberg. The other way was to view the lecture as the whole subject (the whole iceberg) which they had to learn for examination purposes. What many lecturers and some students tended to regard as the tip, others regarded as the whole iceberg. There was a tendency for attitudes of staff and students to differ in this respect, staff tending to regard lectures as frameworks on which to build further reading and students tending to postulate that the set of notes obtained from lectures was all they needed to know on the subject."

All the descriptions so far discussed have concerned interpretations of people's experiences in trying to learn something. Säljö (1979 a) has, instead, based his description of conceptions of the learning on views expressed by his subjects in connection with a general discussion of the

phenomenon in an interview situation. He distinguished between five qualitatively different forms of thought.

1. Learning as an (quantitative) increase in knowledge
2. Learning as memorizing
3. Learning as the acquisition of facts, methods etc. which can be retained and used when necessary
4. Learning as the abstraction of meaning
5. Learning as an interpretative process aimed at understanding reality

As new categories for the description of the experience of learning are arrived at in studies carried out in various contexts, a central question arises: How are the categories related to each other? It is essential to find out, for instance, whether one set of categories refers to another but related aspect of the experience of learning as another set of categories (as is the relationship between Marton & Säljö's deep/surface distinction and Svensson's holistic/atomistic distinction) or whether a set of categories is subordinate to a category described previously and consequently constitutes a more precise and detailed characteristic (as is the case with Ramsden's above-mentioned results in relation to Marton & Säljö's dichotomy). We can not find out how various categories are related to each other unless we work on a far more detailed level than is possible on the basis of rather general descriptions. In order to increase the precision of our characterization of deep and surface approach we enclose here our judgement instructions used to identify the various symptoms which define these two approaches (appendix 1). The judgment instructions were based on and applied to transcripts of interviews concerning the experience of learning in experimental settings. There are separate judgement instructions based on transcripts of interviews concerning normal studies at University. The symptoms are, however, very similar in both cases but appear in a more distinct way in the former.

The distinction between deep and surface approach was, in fact, first introduced by Marton (1975) as deep- and surface-level processing, a terminology borrowed from Craik & Lockhart (1972). The level-of-processing analysis obviously represents a from-the-outside perspective and its terminology was subsequently replaced by terms referring to the experiential perspective. We believe that it is now time to rejoin these two perspectives. Characterizing "... the different perceptual or semantic strata of the stimuli which are the object of attention" (as is done in the levels-of-

processing analysis) can be regarded as describing from another point of view "how the learner experiences something in his world which appears to him".

Relationship between process and content

Our strong sense of content orientation has been pointed to above. By content orientation we mean that when one studies the different ways people have of perceiving the world around them one starts with what is perceived as different. The learning phenomenon is in itself a distinct part of people's thinking. They have experienced it in a specific way and often (but not always) have specific conceptions of it. If we pursue this further it is, however, obvious that learning can not only constitute a distinct part of the content (of a person's thoughts) but also and above all that the act of learning itself of necessity has a content, namely the matter of thing about which something is learnt. In other words, it is a question of two different levels. We are thus back to our starting point. We want partly to describe how people perceive the substance of learning, i.e. the learning phenomenon as thought content. These two levels are organically coupled to each other. Marton and Säljö (1979) have, for example, illustrated empirically the fact that those people who perceive learning as a question of memorizing tend to regard a text they have been given to read as "flat", so to speak. They seem to see the text as not having the dimension of depth and they do not perceive the hierarchic structure of the argumentative prose. They seem to perceive the text as a number of bits arranged in series.

This is essentially the same phenomenon as the one reported in Marton & Wenestam's (1979) above mentioned study. The main point of the text is not understood as superordinate to the example. Either it is "lost" and the reader believes that the text is about the example (which is of course not seen as an example) or the main point and the example are conceived as two different (and separate) things, equally important, and without any obvious connection.

Changes in the conception of learning

Diana Laurillard, who is a member of a research group at the University of Surrey, England, and whose work has strong links with the research tradition now in the process of emerging in the field of "student learning",

has clearly established the contextual character of the conceptions or ways of learning (Laurillard 1979). The students in her study were followed in different learning and teaching situations and it was observed that the majority of them varied the way in which they approached the learning task from situation to situation and from task to task:

"The different characteristic approaches to learning tasks are thus intelligible if we see them as characteristics not of the individual student, but of the student in relation to a particular learning context - it is the pattern of relationships involved that remains constant across a variety of situations and different students. In this sense, the source of a strategy of learning is traceable to the students' perceptions of the context within which he is working - his choice of strategic approach to a task depends on his orientation towards it, his reasons for doing it, and on what he aims to get out of it."

This leads us to the problem of not so much explaining but rather understanding why people define a learning task in a certain situation in a certain way. This choice (or adaptation) - to the extent that it occurs in individual cases - has also been shown to have a connection with the perception of the situation's demand structure (Marton & Säljö 1976 b), the perception of relevance as a function of the content of the task (Fransson 1977) and the perception of relevance as a function of the hidden messages transferred by the teacher by means of his way of presenting them (Hodgson 1979).

Even if it is true that the majority of the students at university are able more or less consciously to choose between one or another way of approaching the learning task, it is far from true that all people have this opportunity. On the contrary, Säljö (1979 b) claims that the improved learning skills often resulting from higher education in fact manifest themselves in the form of a conscious reflexion upon the phenomenon of learning. "Learning" is thematized and regarded as something which should not be taken for granted and which can be done in different ways. Differences in approach can, from this perspective, prove to be related to differences in the perception of different parts of the education system (9-year compulsory comprehensive school, integrated upper secondary school, university) as learning environments (Säljö 1979 c). As Svensson (1977) pointed out earlier, university studies often involve reading such a large number of pages that selectivity is an absolute necessity. It is difficult to reconcile this demand for selectivity with a memorizing strategy and it is from this conflict that the above-mentioned reflexion often arises.

Learning can mean different things and can be perceived in different ways. Furthermore, there seems to be a tendency to, as a function of one's own educational experiences, abandon one conception for another. This is mentioned in an individual perspective. In his study referred to above, Säljö (1979a) related the five different conceptions of learning not only to the subjects' level of education but also to their age and thus to when they had gained their experience of education. There is a clear tendency for younger people and those with higher education to more often have "advanced" perceptions. Säljö wonders whether results of this sort could enable us to "read" how the dominating view of different aspects of reality in society give rise to thought forms in terms of which people interpret the world around them. In other words, Säljö believes that there has been a shift in society as a whole towards the more "advanced" conceptions of learning. If one were then to read Gunnar Richardson's historic study of Swedish educational policy during the years 1940-45, then one would be greatly inclined to agree with this conjecture. The then dominating view of knowledge, learning and teaching seems to differ radically from today's view. (Compare for example, the extremely static view that emerges when one of the then professors of pedagogics says that "... one of the tasks of educational psychology is to draw a picture of the Swedish youth and 'as it were establish an inventory of the soul'" (Richardsson 1978, p 42).)

This is an example of how one can bring together results that come from studies that differ with regard to sources of variation (e.g. differences between individuals and differences between historical periods) but have that which varies in common e.g. conceptions concerning the nature of learning and knowledge.

III IMPROVING LEARNING

The next question to be faced is "How can results arrived at from the experiential (from-the-inside) perspective facilitate better learning?" In a previous context we developed our view of the relation between theory and application on the basis of Habermas' (1968) distinction between technical and emancipatory knowledge interests (Marton & Svensson 1979). The former means that we expect that we can derive from the theory rules for action more or less in terms of operational algorithms: You should do this and that in this and that way. Our opinion is that such a relation between theory and application is neither possible nor desirable in the field of learning. Here action must be based on detailed knowledge of the specific conditions of the

context in which the action is supposed to take place. In accordance with the emancipatory knowledge interest, theory should aim at heightening the participants' consciousness and thereby enlarge their chances of a more reflected-upon and better choice of action.

By studying ways of understanding (and misunderstanding) various contents we hope to gain and facilitate insight into frequently taken-for-granted conceptual prerequisites of the grasping of basic concepts and principles. Marton & Dahlgren (1976) have for instance pointed out the importance of the "... distinction ... between thinking in terms of the rather abstract concept of productive resources and the more concrete concept of production (or output, i.e. goods) as far as the understanding of some basic principles in Economics are concerned. Both Marton and Wenestam's (1979) and Marton & Säljö's (1979) above-mentioned studies imply that we cannot take for granted people's understanding of the hierarchical structure of the principle-example relation in argumentative prose.

Another example of the need of learning about the students' world of thought is related to Johansson and Lybeck's above mentioned description of the two different forms of thought related to proportional reasoning, namely one form which concerns relation between variables and another which concerns relation within variables. If the teacher or the text-book writer is not sensitive to this fundamental difference he may create great difficulties for the students. Consider for example the following excerpt taken from a text book in physics for secondary school (Staffansson et al 1978):

"Our experiment tells us perhaps that 6.0 cm^3 of aluminium weights 16.2 g. A half as large a volume, 3.0 cm^3 , has a mass half as large, 8.1g; for a three times as large a volume. 18.0 cm^3 , the mass is three times as large, 48.6 g and so on. If the mass increases in this way we say that the mass is proportional to the volume. It is written

$$m \propto V$$

The relationship between the mass and the volume can be expressed by the equation

$$m = \rho \cdot V."$$

We can here see how the relation between mass and volume is based on a reasoning in terms of relation within volume and mass separately. The transition from one form of thought to another is taken for granted. From the students' point of view, however, this is by no mean self-evident (Lybeck 1978).

The more general aspect of the experience of learning concerns the way the act of learning (and the context of learning) appears in people's consciousness. We have pointed out that the conception of learning (or, in other words, the approach to learning) according to which a certain individual acts usually varies contextually. A question that then arises for instance, is whether or not we can facilitate a deep approach to learning. One of the most powerful factors which can shape learning is the kind of questions the learner expects to get afterwards. In several studies (see, for instance, Marton and Säljö 1976 b for a brief review) a somewhat paradoxical result was obtained. Even if the questions which we ask and which the students anticipate are of the "deep"-kind the very fact that students have a fairly clear notion of the kind of questions they are going to be given tends to lead to a surface approach. The questions become ends in themselves, learning turns "technified", the students try only to select information necessary to answer the questions and the contents gets "eroded" thereby.

Edfeldt (1976) has shown that learning which focusses the reader's attention on the technical aspects of the reading process deteriorates understanding as a result of the directing of consciousness towards surface aspects. He has brought together findings from his own research into reading and our research into learning:

"... what is central in the reading process is the reader's direct and uninterrupted contact with the subject-matter in the text. A direct result of this is that every form of interruption of the contact between the reader and the text's subject-matter leads to a deterioration of the reader's performance. Such interruptions can be just as clumsy as those which occurred in connection with eye-movement exercises, during attempts to eliminate with the help of exercises speech-muscle activity, during a forced concentration on carriers of understanding (key words) or during other situations where rules concerning study techniques are applied. They can also be of such apparently high content-promoting value as, for example, those which occur in connection with the most refined mathemagenic activities. They can in this last-mentioned case have the form of direct questions or structuring sentences which have been slipped into the running texts. A common feature of all these different phenomena is that they do not in any way promote any form of contact between the text's subject-matter and the reader on the reader's terms. This means, of course, that the only aid that is adequate for a better understanding of the text comes from the reader's own frame of reference. Everything that is brought in from outside, e.g. pure technical advice or structuring measures affecting the content with an assumed basis in the author's frame of reference or an actual basis in someone else's frame of reference, puts a stop to the spontaneous and necessary interplay between the reader and the text's subject-matter."

We think this is a very important problem not the least as regards the way text-books are written, for instance, for use in compulsory school in Sweden. For the reader, the continuity of the text very frequently is interrupted by all the interspersed questions which are inserted in the well-intentioned but erroneous belief that in this way we can facilitate and maintain an active attitude in the learner. Needless to say the reverse occurs: the focussing on surface aspects makes work with text-books unbearably boring.

As to various attempts to improve learning skills in students, the impossibility of distributing how-to-do prescriptions is now being gradually realized and in several quarters work is being done on raising the students' consciousness of the fact that learning is a changing and changeable aspect of their existence (Gibbs 1979, Harri-Augstein & Thomas 1978, Hounsell 1979).

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APPENDIX 1

JUDGEMENT INSTRUCTIONS

Our intention here is to judge the learning process from the point of view of approach (to learning) with a clear attitudinal component. We are trying to define a positive and a negative pole. Whether these are in the same dimensions or not can be disregarded in the present context. The aim of the judgement is mainly to ascertain whether the positive or the negative symptoms (signs) are descriptive of the individual subject (fit the individual subject). Naturally, both of the symptoms (signs) as well as none of them (S is indifferent) can fit a particular subject. Within both the syndroms there are different symptoms (signs) which can be found individually or together with others. Your task is to mark which symptom (sign) or symptoms (sign) you can find with each subject. As was mentioned earlier, there may be cases where none of the symptoms (signs) to be listed can be found.

1. DEEP APPROACH

1.1 U (directed towards understanding)

Ex

[thought of, got an idea about, wanted to find out, remembered, realized]	[the aim, what it was; all about, the conclusion, the point]	[(of) the article (of) some part, of the article]	[while reading, during, the recall]
---	--	---	--

i.e. S focuses attention on the INTENTION OF THE ARTICLE (AUTHOR), which can be expressed in many different ways.

Contraindication

did not detect (find out) the main point, the intention etc.
Thought about the conclusion but not about how they (he, the author) had reached it.

1.2 R (relation)

Ex

tried to see the connections between the different things,
went back in order to see the coherence (connection),
was still at the previous page when she read the next etc.

i.e. S ACTIVELY TRIED TO INTEGRATE (RELATE) WHAT HE WAS READING
WITH PREVIOUS PARTS.

1.3 C (construction, reflexion, critical attitude (concerning the logic of arguments))

Ex

drew his own conclusions from the tables,
went back to the tables in order to check the conclusions,
thought about the logic of the arguments etc.

i.e S TRIED TO USE HIS OWN ABILITY TO MAKE A LOGICAL CONSTRUCTION.

1.4 S.C. (structural clarity)

Ex

realized that it concerned a motivation as to what was wrong,

[thought about, wanted to see etc.]	[how]	[the whole thing, the message, the discussion (argumentation)]	was constructed.
--	-------	---	------------------

i.e. S THOUGHT ABOUT THE FUNCTIONAL ROLE OF THE DIFFERENT PARTS.

2. SURFACE APPROACH

2.1 HI (T) (hyperintention - time)

Ex

did not remember what she read because she only thought about
hurrying up,

it was an awkward feeling of being forced to get through it in time etc.

i.e. THE ATTENTION OF S WAS FOCUSED UPON THE TIME-FACTOR INSTEAD OF UPON THE ACTUAL TASK (UNDERSTANDING).

Contraindication

did this at the beginning.

2.2 HI (D) (hyperintention - demands)

Ex

[felt the demand,
concentrated upon,
only thought about,
etc.]

[having to understand,
having to recall,
having to be able to perform,
etc.]

i.e. THE ATTENTION OF S WAS FOCUSED UPON THE DEMAND TO PERFORM INSTEAD OF UPON THE ACTUAL TASK (UNDERSTANDING).

Contraindication

Ex

To start with I thought

affirmative answer to a direct question without further comments (relevant to HI(T) and HI(M) as well).

2.3 HI (M) (hyperintention - memorizing)

Ex

[concentrated upon,
(most of the time)
thinking about]

remembering

i.e. THE ATTENTION OF S WAS FOCUSED UPON MEMORIZING INSTEAD OF UPON THE ACTUAL TASK (UNDERSTANDING).

Contraindication

A certain amount of hesitation when directly questioned (relevant also to HI (TP) and HI (DC)).

repeated, made a close analysis of certain things in view of the recall.

2.4 M (memorizing)

Ex

you have to read it several times if you are to remember,
there are different tracks to memorize,
tried to memorize the figures,
paid attention to certain words which were repeated frequently
etc.

i.e. S DEFINES LEARNING AS BEING EQUIVALENT TO MEMORIZING.

2.5 C (constrained)

Did not find the peace to think about what it was about about,
you do not reread the sentence even if you do not understand,

did not read in order to read without	think(ing), draw(ing) conclusions, read(ing)
--	--

i.e. S CONFRONTS THE TEXT PASSIVELY AND TREATS IT AS AN ISOLATED
(RESTRAINED) PHENOMENON.

2.6 S (superficiality)

Ex

restricted himself from remained outside did not absorb skimmed (the whole)	text,
--	-------

looked at the figures but not what they referred to,
did not think about what the words meant,
thought about the conclusions, but not about how they had reached it,
clung to figures - without knowing what the concerned, etc.

i.e. S KEEPS HIS READING TO THE SURFACE OF THE TEXT (WITHOUT ANY RELATION
TO THE MEANING:

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